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THE SCRUB OAK FORESTS OF THE ANTHRACITE REGION

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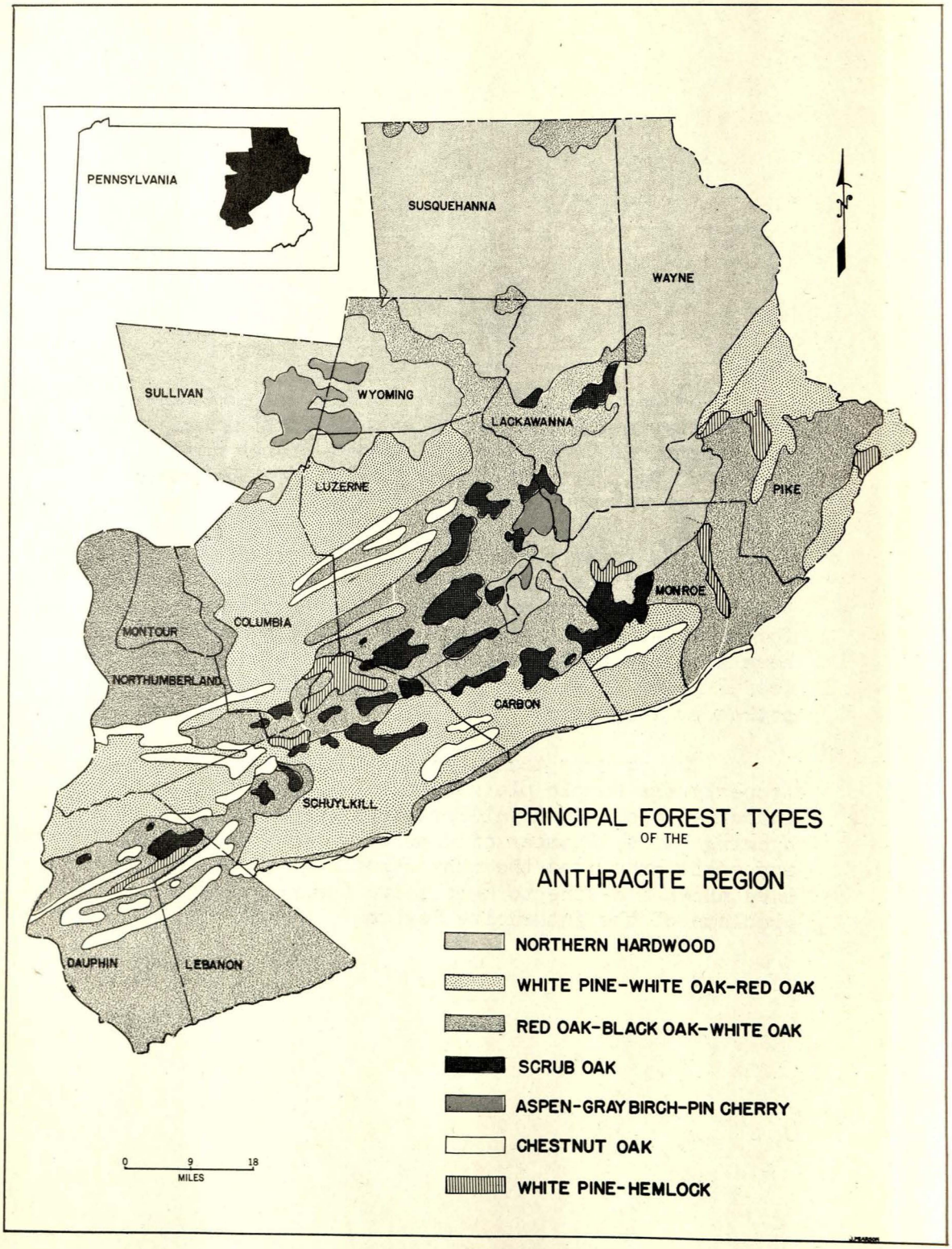
FOREWORD

Research work in forest management and fire protection in the Anthracite Area of Pennsylvania was started in 1945 by the Station's branch at Kingston, Pa. This is one of a series of progress reports on the work completed to date.

This paper presents general information, research findings, and recommendations for applying good forest-management practices to one of the major forest types of the region. The findings presented here are only tentative; but they will serve as a useful guide until more precise and refined information is available.

The authors thank the many landowners on whose property the sample plots were established; the personnel of the Industrial Forestry Division of the Wyoming Valley Chamber of Commerce, for their advice and assistance; and the many other individuals who have shown a desire to help solve the many forest problems of the Anthracite Region.


PENNSYLVANIA
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NORTHUMBERLAND
CARBON
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DAUPHIN
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0 9 18
MILES
PRINCIPAL FOREST TYPES
OF THE
ANTHRACITE REGION
NORTHERN HARDWOOD
WHITE PINE-WHITE OAK-RED OAK
RED OAK-BLACK OAK-WHITE OAK
SCRUB OAK
ASPEN-GRAY BIRCH-PIN CHERRY
CHESTNUT OAK
WHITE PINE-HEMLOCK

THE SCRUB OAK FORESTS OF THE ANTHRACITE REGION

Their Present Condition and Possible Treatment

by C. F. Burnham
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A small portion of our forest land has probably always been covered with scrub oak. There is some evidence of this in fragments handed down to us about certain areas by early historians and travelers. Some of the officers and men who marched with General Sullivan in his expedition against the Six Nations of Indians in 1779 recorded in their journals some derogatory remarks about the country they crossed in what is now Monroe County. Captain Daniel Livermore[1] entered in his journal for June 23, 1779: "During the whole of our march from Easton we travelled through the most barren part of the country I ever saw for so far together. Rocky mountains, sunken swamps and burning plains the whole of the way." Lt. Col. Henry Dearborn's[1] opinion of his travels on the same day was not pleasant. He wrote in his journal: "The whole country from Easton to Wyoming is very poor & barren & I think Such as will never be Inhabited it abounds with dear & Rattle Snakes."

We know from other sources that the country lying between the top of Wyoming Mountain and Blakeslee was known in the old days as "the Great Swamp." It was in this swamp that many of the refugees fleeing from the Indian massacres in Wyoming Valley perished from the wet and cold. It was an area "Twenty miles in length and fourteen in breadth--containing white pine, hemlock and spruce of amazing size and height," according to Lt. William Barton.[1] It seems safe to conclude, then, that while the whole journey from Easton to Wilkes-Barre in 1779 must have been very miserable and toilsome, only that portion lying between Blakeslee and Wind Gap was really barren with "the ground universally covered with brush by the name of ground oak," as the Rev. William Rogers, D.D.,[1] saw fit to record in his diary.

1/ Cook, Frederick. Journals of the military expedition of Major General John Sullivan against the Six Nations of Indians in 1779. 570 pp., illus. Auburn, N.Y. 1887.

This was substantiated later by Alfred Mathews in his history of Wayne, Pike, and Monroe Counties.2/ In describing the road from Easton to Wilkes-Barre in 1840 he refers to "a large solitary hostelry, in the midst of the huckleberry barrens."

One theory advanced for this scrub oak condition in Monroe County concerns the Indians. It is said that over a long period of time they used its favorable high location for signal fires. This ultimately destroyed whatever tree growth may have existed on the area, and prepared

Figure 1.--A typical scrub oak area near Freeland in southern Luzerne County.

the way for scrub oak. In more recent times this same area, as well as many others, has been subjected periodically to uncontrolled burns to encourage blueberries. As a result there is now very little on these tracts but blueberries, scrub oak, and scattered pitch pine--all of which have the ability to survive repeated burning.

2/ Mathews, Alfred. The history of Wayne, Pike and Monroe Counties, Pennsylvania. 1283 pp., illus. Philadelphia. 1886.

In 1928 McIntyre3/ estimated that between 2 and 3 million acres of Pennsylvania's forested area were dominated by scrub oak. Ineson, Ferree, and Robinson4/ found that approximately 7.2 percent--231,500 acres--of the 3,198,400 acres of forest area in the 15 northeastern counties comprising the Anthracite Region were covered with this undesirable species.

With the exception of the large area of scrub oak in Monroe County, most of the acreage covered by this type in the Anthracite Region is closely associated with the heavily populated coal-producing counties of Dauphin, Schuylkill, Columbia, Carbon, Luzerne, and Lackawanna. Heavy cutting of the original stands of timber for lumber and mine props, plus repeated fires, seems to be responsible for the major part of the scrub oak acreage.

A 12-inch pitch pine that grew in the "huckleberry barrens" of Monroe County presents some of the evidence. A section from this tree (fig. 2), cut at stump height, shows the effects of repeated fires. Fire scars and abrupt slowings of growth shown by the annual-ring pattern tell that this tree survived at least nine severe fires since 1825. Five of these fires occurred after 1919.

The section shows that the tree grew rapidly until its first setback by fire in 1834, which probably was the time of the early logging in that area. The growth rate slowed down, but after several years the tree recovered and grew well. Then another fire damaged it in 1852. After 1852 the tree continued to grow, but at a very slow rate; repeated burning had sapped its vigor. Other fires damaged it in 1884, 1890, 1919, 1923, 1927, 1933, 1941, and 1946.

This tree must have been a very hardy specimen. With the exception of a few other pitch pines on the same area, all other large arborescent species are dead and gone. The few remaining pitch pines, hardy as they are, show the effects of repeated fires by their misshapen crowns and their distorted trunks. Some of them have given up the struggle.

Scrub oak needs fire to become established. Repeated fires destroy the above-ground scrub oak stems and damage almost all other tree species beyond recovery. Pitch pine is one that has the ability

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3/ McIntyre, A. C. The scrub oak type in Pennsylvania. 1928. (Unpublished manuscript. Pa. State Col. Agr. Expt. Sta.)

4/ Ineson, F. A., Ferree, M. J., and Robinson, D. F. The Anthracit Forest Region--a problem area. Northeast. Forest Expt. Sta. 1946. (In process of publication by U. S. Dept. Agr.)

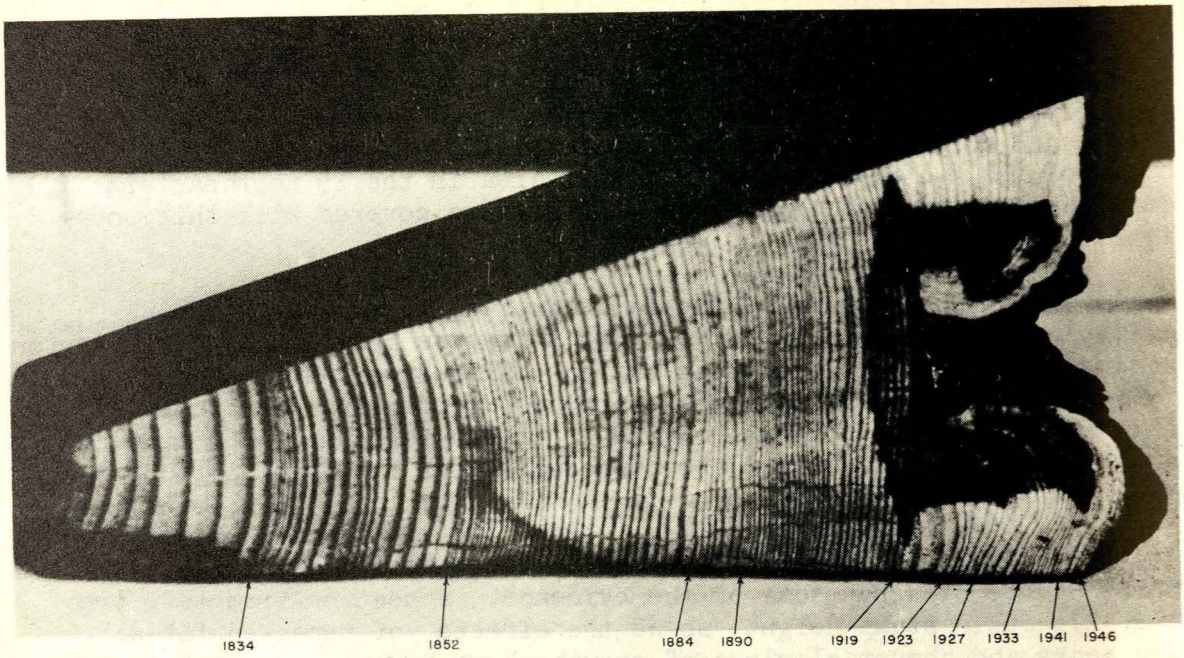

Figure 2.--Section from a pitch pine that grew in the "huckleberry barrens" of Monroe County, showing how forest fires retarded growth. This tree was 51 feet high and 12.3 inches in diameter at breast height.

to survive. Little[5/] found this to be true in the pine-scrub oak areas of New Jersey. Scrub oak, however, is a prolific sprouter; as long as its roots live it will continue to send up many sprouts for each one destroyed by fire.

Will scrub oak ever disappear? Yes, if fires are kept out. This has been generally recognized for a number of years. McIntyre, after an examination of many areas prior to 1928 found that "many areas of scrub oak have a sufficient number of the better class of forest trees on them, and given protection, will in the course of from 25 to 50

5/ Little, S. The effects of forest fires on the stand history of New Jersey's pine region. Northeast. Forest Expt. Sta. Forest Management Paper 2. 43 pp., illus. 1946.

years replace the scrub oak."

To determine just what is taking place in the scrub oak areas in the Anthracite Region, an examination of some typical stands was undertaken in the fall of 1945. Temporary sample plots were studied on areas representing varying time intervals since the last burn. These provided a measure of what might be expected under natural conditions when fires are kept out.

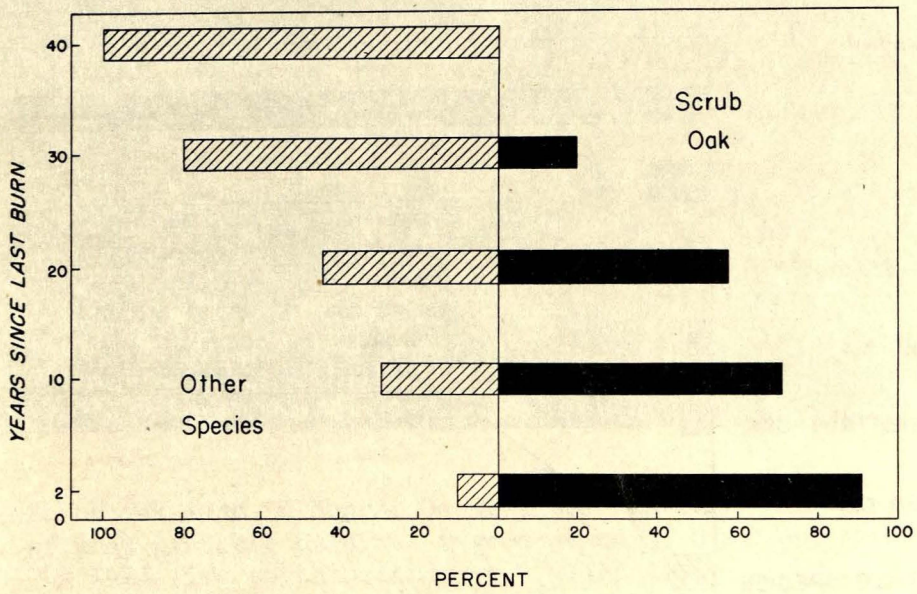

Figure 3.--How scrub oak would disappear if fire were kept out.

The evidence obtained in this study indicates that scrub oak areas will revert naturally to other tree species when fires are kept out. About 40 years will probably be required for the initial new trees to take over the site completely; but a much longer time--probably another 40 years--will be required to develop a stand of real commercial value, because the initial invaders are of little commercial importance.

The species that most frequently replace scrub oak are sassafras, red maple, chestnut oak, and red oak (fig.4). American chestnut[6/] is trying hard to join these other species. Unfortunately the blight,

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6/ Sprouts from old stumps; they soon die.

which removed chestnut from commercial significance years ago, still attacks these stems at an early age and eliminates them from consideration as a future species in the scrub oak areas.

This gradual reversion is shown graphically by comparison of areas that have been free of fire for different lengths of time. Scrub oak land burned over 5 years ago (fig. 5) had on it, besides scrub oak, only a few damaged pitch pines, remnants of what probably was at one

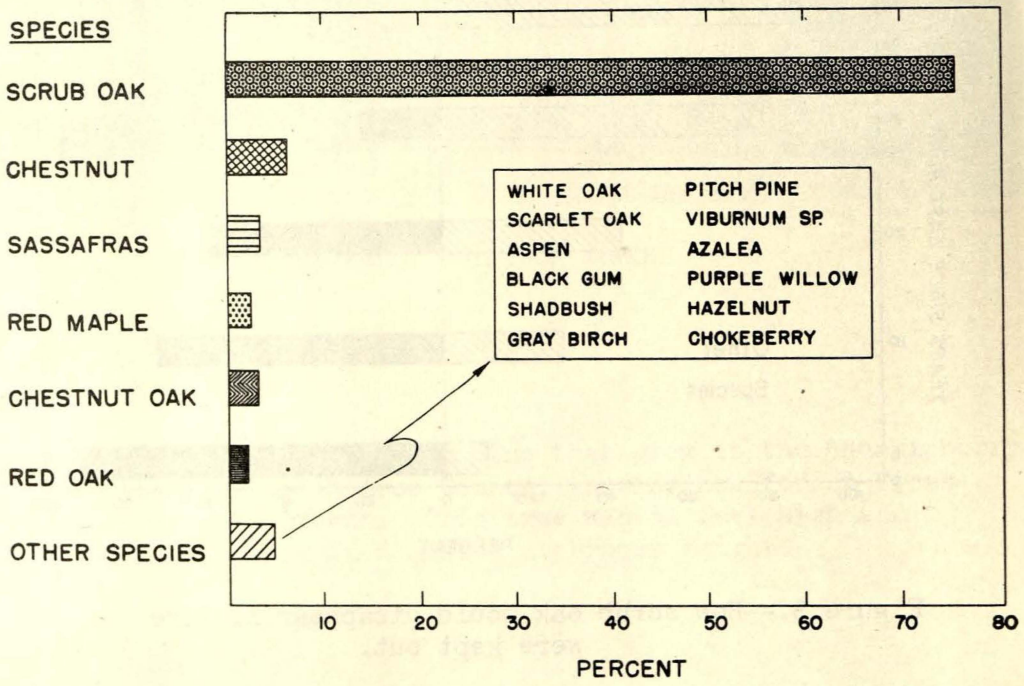

Figure 4.--Species composition of average 8-year-old scrub oak stand.

time a good stand of pine and hardwoods. An area burned over 7 years ago (fig. 6) already is reverting to other species. A tract in Luzerne County, from which fire has been kept out for 11 years (fig. 7), shows what nature can do: arborescent species--although not the best commercially--are clearly overtopping the scrub oak.

Although the invading species will need about 40 years before they can crowd out the scrub oak, there is a possibility that this period of time can be shortened by artificial methods such as planting, direct seeding, reducing scrub oak competition, or combinations of these methods. Several past attempts to artificially convert some of these areas

Figure 5.--Scrub oak land in Monroe County, bearing pitch pine remnants of what probably once was a good stand of pine and hardwoods. The last fire on this land was 5 years ago.

have been extremely costly and not too successful. Byers[7/] in 1926 gave an account of his experiences in planting a scrub oak area in 1912 and following it through a period of 14 years. While survival on some of the treated plots was surprisingly good (60-65 percent), the trees had reached an average height of only 3.6 feet. Such results must have been discouraging; probably they could be attributed in part to the selection of white pine for planting. Byers points out that scrub oak areas offer nothing above site III quality for white pine, which would mean such slow growth that the pine could not compete with hardwood sprouts. The selection of pitch pine, jack pine, or some other species might have produced better results.

Since 250,000 acres in the Anthracite Region is too large an area

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7/ Byers, William L. Forest conversion experiment on scrub oak barrens of southern Pennsylvania. Pa. Dept. Forests and Waters Bul. 41. 1926.

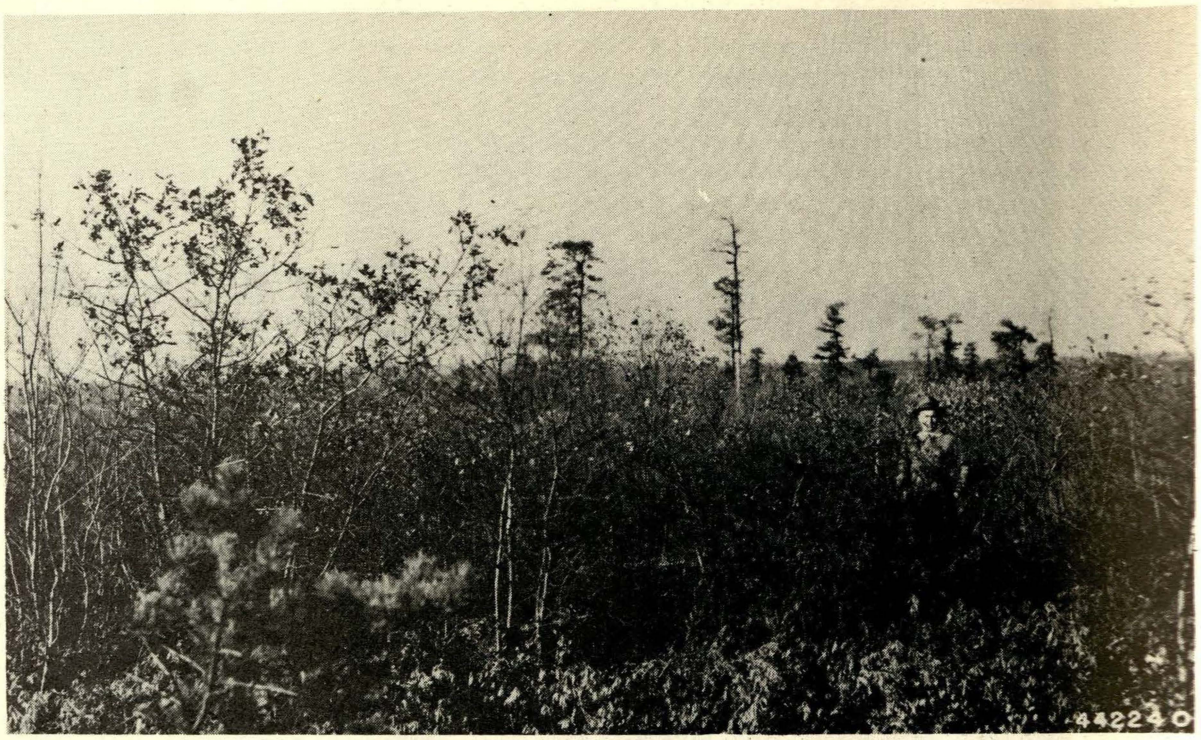

Figure 6.--Scrub oak land in Monroe County, burned 7 years ago.

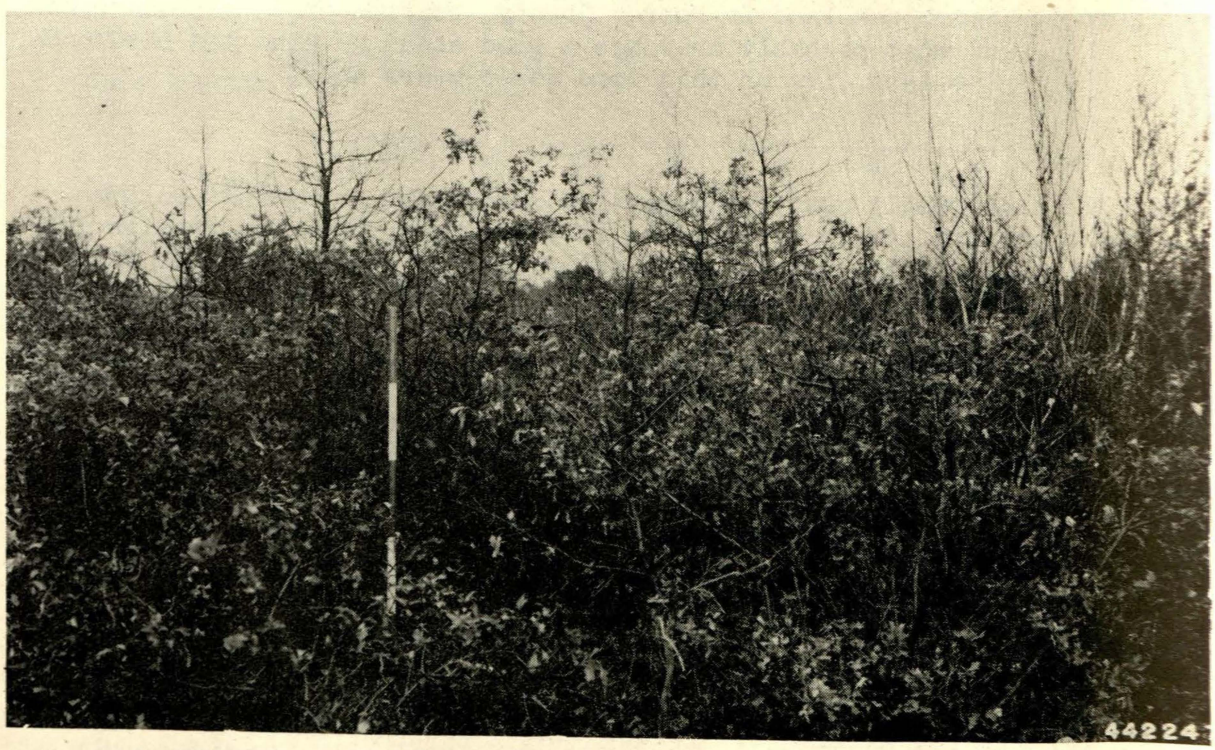

Figure 7.--Scrub oak land in Luzerne County, burned 11 years ago.

to be left in an unproductive state, research is needed to determine the most successful and economical way for converting this area to productivity. At the same time studies should be initiated to determine the effects of conversion on water runoff, animal life, fish life, and even local climate.

Plans for this research are being drawn up, and scrub oak areas have been selected on which the work will be concentrated. Results will be reported as soon as they become available.